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ABSTRACT

Using 1970-71 data for 263 community colleges throughout the United States, the author conducted a study designed to examine the impact of unionization and collective bargaining on the compensation and workloads of community college faculty members. This paper discusses the methodology used and presents two mathematical models for determining the level of faculty compensation, and for determining faculty workload. Results indicate that unionization has raised total faculty compensation primarily by increasing the level of fringe benefits. Although salaries in unionized colleges were 14.6% higher than those in nonunionized institutions, much of the differential was due to factors other than unionization. On the other hand, fringe benefits in the unionized colleges exceeded those in nonunionized colleges by over 96%, and, other than unionization, only size of institution significantly affected the level of fringe benefits. While unionization did not have a significant effect on salaries, it did significantly reduce teaching load. These results suggest that in the initial years of bargaining the faculty have been willing to trade off potential salary gains for increased welfare and better working conditions. In the future, it is expected that these results will change as bargaining matures and certain concerns become less paramount. (Author/DC)

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Collective Bargaining: Its Effect On Faculty At Two-Year Public Colleges

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Introduction

The growth of unionism and collective bargaining in the public sector has been characterized as the single most important labor market phenomenon to occur in the last ten to fifteen years.[1] While the effects of unionization on selected segments of the public sector have been the subject of considerable research the effects of unionization and collective bargaining on two-year public colleges (In this paper the term will be used synonymously with community colleges.) has received little attention.

The community colleges, aside from being the most rapidly growing sector of higher education, have been a public sector "industry" in which unionism has made considerable headway in recent years, and it appears will continue to make further inroads in the future. Even though the spread of bargaining in this sector has been significant and rapid, there are still a large proportion of community colleges as yet unorganized. This feature of the bargaining development—recent and rapid but not total—makes this sector an excellent vehicle for studying the impact of unionization on a segment of the public sector during the initial stages of organization. The concern of this paper is to determine the effects that unionization and collective bargaining have had on the compensation and selected working conditions of faculty in two-year public colleges.

Faculty in all sectors of higher education have been adopting the vehicle of collective bargaining as the mechanism by which the parameters of the work environment are to be determined. It is, however, the community colleges that have proven to be the most fertile area for unionization. An examination of the effects of unionization on community colleges should prove useful in modifying some of the extreme perceptions held by both faculty and administrators regarding the potential impact of unionization. Faculty members tend to look at collective bargaining as the panacea that will overcome the gloomy picture of stagnation that is facing academia. Administrators generally view collective bargaining as a disruptive force that will bring about considerable increases in costs as well as severely limit their ability to manage institutions of higher education. Thus, for purposes of both effective educational planning and effective collective bargaining it seems essential that the early years of bargaining in higher education receive an accurate appraisal. Equally important is the need to direct attention to the larger concern of whether collective bargaining is an inappropriate mechanism for determining wages and other conditions of work in the public sector as some have contended.[2]

Focus of the Study

One of the major limitations of virtually all of the earlier impact studies, both those of the private sector as well as those of the public sector, was their focus on wages. These studies inherently looked upon relative wage gains as being the basis *sine qua non* for determining union success or failure. This myopic focus on wage rate alone fails to consider the multi-dimensional aspects of unionization and the collective

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bargaining process. Wage rates are by no means the sole negotiating item or necessarily the most important. The range of issues both pecuniary and nonpecuniary, discussed and agreed upon at the bargaining table are quite extensive and extend far beyond the question of wages.

At a minumum, if one were going to assess just the measurable pecuniary impact of unionism, then the total compensation package of both wages and employer expenditures for fringe benefits should be examined. There is no *a priori* reason to expect that the impact of unions on fringe benefits should be the same as that on wages. Thus, in examining the impact of unions it is important to determine not only how relative total compensation has been affected, but also what has been the impact on the various components of total compensation. This study will attempt to address the question of the impact of unionism on the total compensation package.

The lack of available measurement techniques for most of the nonpecuniary issues that arise in community college faculty negotiations makes it impossible to assess the "total" impact of negotiations. However, certain aspects of these non-monetary issues can be examined quantitatively. In the case of the community college faculty member we will, in addition to looking at the impact of unionization on faculty compensation, examine the effect of unionization on faculty workload, which will be defined simply as the ratio of full-time equivalent students to full-time equivalent faculty.

Determinants of Community College Compensation Differentials

The model used in this study to explain differences in faculty compensation assumes that compensation differentials arise due to compensating differentials, noncompeting groups and transitional differences. The examination of the impact of these factors on the component parts of compensation, salaries and fringe benefits[3], as well as total compensation allows us to gain significant insights into the way these forces affect the pecuniary returns to teaching. Since the literature is virtually void of any relevant analysis on the determinants of intra-industry fringe benefit differentials, it will be assumed at the outset that the factors affecting salary and total compensation are also those which affect fringe benefits. It will also be assumed, unless noted otherwise, that the direction of the relationships are the same.[4]

Differences due to compensating differentials and non-competing groups will be reflected by two aspects of the community college: (1) differences in the work environment; and (2) differences in the characteristics of the faculty. Differences in the demand for community college education will also be an integral factor in the model.

Differences in the Work Environment

One reflection of the work environment may be simply the size of the student body. It has been argued that larger educational institutions are less desirable places to work in than smaller schools.[5]

There may be certain nonpecuriary disadvantages associated with large institutions in that they may have a more impersonal atmosphere, a large bureaucratic structure with its usual encumbrances, and they may tend to have greater disiplinary problems. It has been noted by Albert Rees[6] that, in addition to the factors already cited establishment size might also act as a proxy for other factors. He suggests that other

things being equal, a larger establishment has to draw its work force from a wider geographic area than a smaller one, and must therefore at the margin offer workers a larger premium to cover the costs of getting to work. If these various disutilities associated with institutional size do exist and require a compensating differential we should expect to find a positive relationship between faculty compensation and the size of the student body.

At the same time one should not expect compensation and enrollment to be linearly related. While it is expected that the disutilities will grow with increased size it is not anticipated that the increase in disutilities will occur in a direct unvarying proportion with enrollment. More likely, there are thresholds such that once a school attains a given level of operations certain disutilities are associated with it. Further increases in size add other disutilities but with the marginal increase in one's disutility becoming less and less. To allow for this positive but nonlinear relationship the natural log of full-time equivalent students (log S) was used in the model. If the above hypotheses are true it is expected that log S will be positively associated with total compensation.

A major facet of the faculty's work environment is the teaching load. Faculty generally prefer fewer and smaller classes. *Ceteris paribus*, it is expected that in colleges in which the teaching load (as measured by the ratio of full-time equivalent students to full-time equivalent faculty (S/F) is relatively high faculty members will receive greater compensation for the additional work performed. It is thus anticipated that S/F and compensation will be positively associated.

Differences in the work environment are not limited to the internal differences that exist among institutions. In addition to the internal differences, there may exist significant variation in the climate, general economic activity, social atomosphere and numerous other conditions that determine the overall external work environment of different institutions. Differences in the external work environment are reflected by the opportunity cost or reservation wage of working in one area relative to another.

It is expected that the supply curve of labor to a particular institution would shift to the left if the value of alternatives to working in a given college increased. This would tend to increase compensation at the institution, *ceteris paribus*. The value of alternatives is in itself a function of a great number of local factors. Such considerations as the extent and mix of industry, the level of economic activity, the rate of price advance, the degree and impact of unionization and the accessibility or lack of accessibility between one area an another all affect the value of alternative employment. In an area where better alternatives exist, the reservation wage will be higher, so too will the level of compensation necessary to attract and retain faculty members. In order to capture some of these effects it was necessary to define a proxy variable to reflect the opportunity cost of teaching at an institution in a geographic area. The opportunity cost variable tested in this model was the average starting salary of a person with a master's degree in the public school systems located in the county where the community college is situated (OPP).[7] This variable was used for several reasons. We avoid the need for using other variables such as the CPJ and population which may have a high degree of multicollinearity not only with each other but with some of the other independent variables. Secondly, the master's degree starting salary was used in preference to that of a bachelor's or doctoral degree because the model degree held by community college faculty members is the master's degree. Third, the great majority of faculty members in community colleges either have taught in public school previously or possess the necessary training to teach in the public schools if they so desired. It should be noted that public school teaching in

many instances may not be the best alternative, but it is an alternative generally open to most community college faculty. This variable is expected to be positively associated with faculty compensation.

The final factor to be included as part of the work environment is the existence or nonexistence of a collective bargaining agreement (U). This factor influences the internal ambience of the college. It has been argued that the presence of a union can act in the same fashion as a licensing requirement in that it creates noncompeting groups. By prohibiting people form working for less than the agreed upon level of compensation, unions in effect eliminate a certain amount of competition. In this study an institution was considered as being unionized if it had a collective bargaining agreement with its faculty covering the 1970-1971 academic year. U is a binary variable reflecting the presence or absence of a collective bargaining agreement at the college. It takes on a value of 1 if the community college has signed a contract for the year 1970-1971, and is 0 otherwise. The basic hypothesis is that compensation will tend to be higher where labor competition is restricted, or more simply faculty with collective bargaining contracts will receive a higher level of compensation, *ceteris paribus*, than faculty who do not negotiate collectively with college administrators and boards.

Differences in Faculty Characteristics

Even though community colleges can be looked upon as being homogeneous in the sense that their clientele are high school graduates receiving post secondary education in a program designed to encompass two academic years, there are substantial differences between community colleges in the curriculum and emphasis of their programs. These differences may be reflected in the composition of the faculty.

Certain community colleges are primarily designed to provide a select number of specialized programs for students who intend to terminate their education with their degree at the end of two years. Other institutions are principally concerned with providing their students with the first two years of general higher education, that is expected to culminate eventually with the student receiving a bachelor's degree from a four year college or university. Almost all community colleges offer both types of programs, the differences being in the emphasis accorded one program relative to the other. Where the accent is on a broad-based background in many academic areas, the faculty needs are accordingly broader. A larger percentage of the faculty will necessarily have to be drawn from a very diverse set of disciplines. The faculty recruited will be expected to teach a wider variety of courses than those traditionally incorporated into the so called liberal arts core. In other words, the community colleges will not be recruiting from one labor market of academics or potential academics, but from a group of segmented labor markets that are distinguishable by their academic disciplines. Each of these labor markets is characterized by having different alteranatives. It is customarily the case that faculty in the sciences have better alternatives.[8] Given the higher reservation wage of scientists, it will be necessary to pay them a correspondingly higher level of compensation to attract and retain them. It is our contention that the greater the proportion of faculty who are in the sciences the higher will be the average compensation of the entire faculty.

Given that there may be differences in faculty compensation because of the need to hire from segmented academic labor markets, one will also find within these markets people possessing different levels of skill. This will be due to either differences in

innate ability or to variations in the embodiment of human capital or both. If it is assumed that the degree held is a measure of skill within a discipline, and if greater skills do in part reflect a greater will tend to get paid more. This is in fact one of the principles that is embodied in any salary schedule based on educational attainment and experience. One measure of the quality of the faculty at an institution is the percent of faculty possessing only the bachelor's degree %B.A. Since, most faculty at community colleges possess a master's degree, by recruiting and maintaining a relatively large percentage of the faculty members with only a bachelor's degree the institution may not be fostering a relatively low quality education. Or, by offering a low level of compensation, the institution may not be able to recruit people with advanced degrees and must be satisfied with a substandard faculty. An inverse relationship is thus expected between %B.A. and the average level of compensation at an institution.

There are other differences in the characteristics of faculty members that could possibly lead to differences in compensation. Such factors as the experience, sex and race characteristics of the faculty might be able to explain some of the variation in compensation between institutions, however, the data necessary to test the effects of these variables was not available for their incorporation into the empirical model. The exclusion of these variables could introduce a bias into the estimated parameters. Thus, for example, if any of these factors is positively associated with unionization and with the measure of compensation, then the union parameter would tend to overstate the true relationship between unionization and compensation (assuming that unionization has a positive effect on compensation).

Differences in Demand

The model can be expanded beyond the supply considerations already discussed by considering differences in the student and community ability to pay for the "product." We can briefly define the "product" as the purchase of a community college education. The demand for community college faculty is derived from the demand for the community college education. Clearly, the greater demand for a community college education the greater the demand for faculty to teach in a community college.

There are three basic components to the demand for the community college education: the demand of the state; the demand of the local community; and the demands of the students. It is generally the state government that will set the tone of the sources of support to community colleges. State support of community colleges varies widely. In some states the state government provides virtually 100 percent of the community college revenues. In other states, the primary source of revenue is the local community. While in others, the burden is shared in various proportions by the states, the local community and the students. Additionally, it would not be uncommon to find some community colleges within a state totally supported by state revenues while other schools within the state receive little state support. Because of the many possible variations in funding there is only one reasonable measure of community college demand—total expenditures per student (E/S). Expenditures per student reflect the total demands of all three groups and is standardized so as to account for differences in the sizes of the colleges. This variable is expected to be positively related to faculty compensation (i.e., better quality faculty are hired where demand is greater).

The expenditures per student variable covers only one aspect of the demand side. It

can be viewed as determining the budget constraint. College administrators must then allocate this budget to achieve desired output goals. Under a fixed budget college administrators can choose to hire a relatively small number of high quality instructors or a relatively larger number of lower quality instructors. There is no theoretical basis for postulating which alternative is preferable. However, there is some indication from the empirical literature that the extent of local involvement may have a bearing on the budget allocation decision.[9] The level of community involvement will be measured by the percent of college revenues that come from local sources (%LA). The empirical studies suggest that there may be a positive relationship between %LA and total compensation but since there is no theoretical basis for the direction of this association all that will be postulated here is that faced with the same level of local participation college administrators will tend to operate in a similar manner when making the allocation decision.

To summarize the above discussion, we have argued that compensation is a function of six supply variables—the log of full-time equivalent enrollment (logs); the student-faculty ratio (S/F); the average starting public school salary of a teacher with a master's degree (OPP); the existence of a collective bargaining agreement (U); the percent of faculty in the sciences (%Sci) and the percent of faculty possessing a bachelor's degree (%BA). In addition, total expenditures per student (E/S) and percent local aid (%LA) represent the demand variables in the model.

The model can be expressed in the following form:

(1) $Ci = b_0 + b_1 (\log S) + b_2 (S/F) + b_3 (OPP) + b_4 (U) + b_5 (\%Sci) + b_6 (\%BA) + b_7 (E/S) + b_8 (\%LA) + e_i$

C_i is the compensation variable (C_1 = salary; C_2 = fringe benefits; C_3 = total compensation) ei is the error term; and the other variables are as defined above.

Compensation Model—Regression Results

Results from the cross-sectional analysis of the compensation model, using 1970-1971 data for 263 community colleges, throughout the United States are displayed in Table-1. The model explains nearly 67 percent of the variation in total compensation, 66 percent of the variation in salaries and 30.9 percent of the variation in fringe benefits.

Only one independent variable, log S, was significantly related to all three dependent variables. This variable as expected was positively associated with each of the dependent variables. This set of coefficients indicates that as enrollment increases, *ceteris paribus*, compensation, salary and fringe benefits increase but at a diminishing rate.

As was indicated above it was expected that total compensation would be higher, the higher the incidence of faculty in the sciences. The regression results bear this assumption out. Both salary and total compensation were positively and significantly associated with changes in %Sci. The level of fringe benefits was not significantly related to changes in this independent variable. Thus, changes in the distribution of faculty who are in the sciences affect total compensation mainly by changing average salaries (presumably the salaries of those in the sciences).

The fact that this variable did not have a significant impact on fringe benefits, is in retrospect, not surprising. An institution that wishes to attract more scientists by

TABLE 1

Regression Coefficients for the Determinants of Faculty Compensation (1970-1971)

Dependent Variable Independent Variable	Salary	Fringe Benefits	Total Compensation
% B.A.	−3.735	2.224	−1.1382
	(5.2181)	(2.2556)	(5.7749)
% SCI	14.46*	5.257	20.843**
	(7.9789)	(3.4489)	(8.8302)
OPP	1.38***	0.0211	1.38***
	(0.12169)	*(0.052603)*	*(0.13468)*
*Log S***	302.93***	202.85***	502.72***
	(94.290)	(40.757)	(104.35)
S/F	69.56***	−5.694	67.65***
	(17.091)	(7.3878)	(18.915
U	362.77	694.5***	1074.3***
	(242.29)	(104.73)	(268.14)
E/S	0.44572**	0.087742	0.5467**
	(0.19489)	*(0.0844242)*	*(0.21568)*
% L.A.	14.14***	2.126	12.08***
	(4.1485)	(1.7932)	(4.5911)
Constant	−4746.3	−933.95	−5709.7
R^2	65.92	30.90	66.65
Standard error of the estimate	1226.9	530.32	1357.8

*** Significant at $p<.01$
** Significant at $p<.05$
* Significant at $p<.10$

Note: Standard Errors are in Parenthesis

paying higher salaries can limit the group that receives the higher compensation. If fringe benefits were raised, so as to increase the attractiveness of the institution to a prospective or current faculty member, they would have to be increased for all faculty and would therefore be far more costly than raising wages for a select few.

The opportunity cost variable was also positively associated with both salary and total compensation. With all other factors held constant, a one hundred dollar increase in OPP would cause an increase in salary and total compensation of $138. This relationship suggests that when competitive salaries rise, college administrators adjust the compensation of their faculty by increasing the salary component of compensation.

The student-faculty ratio was significantly and positively associated with variations in salary and total compensation. These results support the hypothesis that colleges pay faculty a compensating differential to overcome the unattractiveness of teaching larger loads. Holding all other factors constant, it is estimated, that for each unit increase in S/F total compensation increases by $67.65.

It also turns out that the demand variable, percent local aid is directly and significantly associated with salary and total compensation. It was noted earlier in the discussion of the model, that the sign of the relationship between %LA and the compensation variables could not be specified *a priori*. The results of the regression analysis suggest that the greater the financial involvement of the local community in the operations of the college, the higher will be the level of salaries and consequently total compensation, all other factors being equal. The value of fringe benefits was not significantly realted to %LA.

One of the more interesting results of this set of equations is the relationship between the binary unionization variable and the compensation variables. Unionization and salary were not significantly related, but unionization and fringe benefits were directly and significantly associated. The unionization effect on fringe benefits was so pervasive that total compensation was also found to be significantly and positively associated with unionization. These results suggest that in community colleges one of the major effects of unionization has been a significant relative increase in the level of fringe benefits. Percent of faculty with a B.A. was designed to reflect the variance in the skill mix of faculty from one institution to another. The lack of a significant relationship between this variable and any of the compensation measures indicates either that differences in skills are an unimportant determinant of compensation or that this variable is not truly measuring the intercollege skill variation.

In light of our results it is of interest to put the changes inherent in the regression analysis into perspective. Table-2 shows the mean levels of salary, fringe benefits and total compensation separately for the colleges in the sample that were unionized and those that were not unionized. The table indicates that salaries in unionized colleges were 14.6 percent higher than those in the nonunion institutions. However, much of this differential can be explained by factors other than unionization. As was indicated in the regression analysis differences in the work environment, principally reflected through the alternative wage, enrollment and the student-faculty ratio explain a large part of the difference between salaries in the two groups. In addition, differences in the characteristics of the faculty and differences in demand were also able to account for some of the differential.

Employer contributions to various fringe benefits were substantially different at the two types of colleges. As can be observed from the table, fringe benefits in the unionized colleges exceeded those in the nonunionized institutions by over 96 percent. The only variable, other than unionization, that significantly affected the level of fringe benefits was the log of enrollment. This variable probably acts as a proxy for the price of fringe benefits. The larger the size of the group receiving benefits, the lower are the administrative costs and the lower is the risk in providing a given fringe benefit. It is possible taking account of the influence of enrollment and other factors to estimate the union, nonunion differential in fringe benefits. This can be done simply by dividing the union regression coefficient by the average level of fringes in the nonunion colleges. Using this method we would then estimate that unionization has raised fringe benefits nearly 80 percent over those prevailing in nonunion colleges.

A similar approach can be taken with total compensation. Table-2 indicates that without taking account of any factors other than unionization, the difference in total compensation between the union and nonunion colleges is over 20 percent. After

TABLE 2

Differences In Salary, Fringe Benefits, And Total Compensation Between Community Colleges With and Without Collective Bargaining Contracts 1970-1971 Academic Year

Compensation Measure	Colleges With Contracts (N = 38)		Colleges Without Contracts (N = 225)		Percentage Differences (1) − (3) / 3
	Mean (1)	Standard Deviation (2)	Mean (3)	Standard Deviation (4)	
Salary	11993.6	1266.3	10463.5	2098.5	14.6%
Fringe Benefits	1665.7	934.3	849.2	469.6	96.1%
Total Compensation	13659.6	1840.3	11311.3	2215.7	20.8%

SOURCE: Based on a sample of institutions from the Higher Education General Information Survey, U.S. Office of Education, 1970.

these other factors are taken into account the difference is under 10 percent and obviously a large part of this differential can be explained by differences in fringe benefits.

Faculty Teaching Load Model

Pecuniary matters are by no means the sole concern of negotiators in higher education. Numerous facets of the work environment have become the subject of negotiations. One of the more frequently discussed areas of concern is faculty teaching load. College administrators would generally oppose proposals by the faculty that would serve to lower the number of classes taught and/or the number of students placed in a class. Each of these issues has been the focus of negotiations, and an area of conflict between labor and management.

The teaching load model combines institutional considerations with assumptions regarding the behavior of college administrators. The model argues that teaching load, measured by the ratio of full-time equivalent students to full-time equivalent faculty (S/F), is a function of the percent of faculty with a B.A. degree (%BA); the number of full-time equivalent students (S) and its square (S^2), the change in the size of the student body over the previous academic year (Δ S), percent of revenue from local sources (%LA), expenditures per student (E/S) unionization and the level of compensation (C_3). The model would thus take the following form:

$$S/F = b_0 + b_1 (\%BA) + b_2 (S) + b_3 (S^2) + b_4 (S) + b_5 (\%LA) + b_6 (E/S) + b_7 (C_3) + e$$

Where the bi's are the estimated parameters and e is the error term and the variables are as defined above.

The student-faculty ratio was expected to be inversely related to %BA. Since B.A. degree holders are generally considered to have substandard credentials, they are usually hired at lower salaries than their collegues with more advanced degrees. The

greater the willingness of an institution to accept faculty with substandard credentials, the larger will be the size of the faculty that it can afford to hire for a given budgetary outlay.

A positive association was expected between the student-faculty ratio and the percent of an institution's revenue that was provided for by local governmental sources. Since %LA was positively associated with faculty compensation in the earlier model, it was assumed that where %LA was high, college administrators would prefer to hire a relatively small but higher paid faculty.[10] Thus the higher %LA the greater the likelihood that college administrators will choose to have larger classes and/or have faculty teach a greater number of classes. A positive association was, therefore, anticipated between S/F and %LA.

Since physical facilities and faculty contracts are usually fixed in the short-run (at a minimum an academic year) marginal adjustments of faculty to changes in student population becomes a cumbersome and expensive undertaking. It seems reasonable to assume that college administrators will adjust to increased enrollments by either expanding the number of students sitting in a classroom or increasing the number of classes faculty members teach rather than by adjusting the size of the faculty to meet increases in the size of the student body. By the same token, it will also be assumed that for short-run decreases in enrollment the reaction will be to reduce class size and/or the number of classes taught per faculty member. The change in enrollment, as used in the analysis, was calculated by taking the change in full-time equivalent students between 1969 and 1970 and dividing it by enrollment in 1969. This variable (ΔS) was hypothesized to be positively related to the student-faculty ratio.

It is also assumed that college administrators and college boards will build a physical plant that is designed to accommodate a given level of students. The larger the expected level of students the more appropriate it becomes to plan larger classrooms that easily facilitate the use of the mass lecture technique. This is especially useful where the majority of the students are expected to take a set of basic courses. Where this is the case, mass lecture halls become not only feasible but also practical. Bigger classrooms will tend to encourage large student-faculty ratios as faculty are asked to teach more students per class. Large enrollments also make it feasible to offer specialized courses that could not be accommodated without some minimum expected enrollment. The offering of specialized courses would have the effect of lowering the student-faculty ratio. In order to capture this possible non-linear effect of enrollment on the student-faculty ratio, full-time equivalent enrollment(s) and its square, (S^2) were used in the model.

Institutional expenditures per student (E/S) was anticipated to be inversely correlated with the student-faculty ratio. Since smaller classes are usually preferred to larger ones (even by administrators), the college was expected to translate higher expenditures per student into smaller classes.

On an *a priori* basis the expectations with respect to the impact of collective negotiations is unclear. Faculty associations normally include as part of their demands a reduction in the number of teaching hours and/or a smaller number of students. On the other hand, college administrators who are faced with compensation demands and relatively fixed budgets may be willing to trade off pay increases for larger teaching loads. Or they may possibly be willing to reduce teaching loads if compensation demands are reduced. The sign of the relationship thus is a function of what and how much faculty and administrators are willing to trade and cannot be determined *a priori*.

The student-faculty ratio was expected to vary positively with the level of total compensation (C_3). For a given budgetary expenditure per student and for a given number of students, the higher the level of compensation the smaller will be the size of the faculty that could be hired. Consequently, the higher the level of compensation the higher will be the number of students per faculty member.

Teaching Load Model: Regression Results

Table-3 displays the regression results obtained from equation 2. The independent variables were able to explain nearly 54 percent of the variation in the student-faculty ratio.

The number of full-time equivalent students was positively related to S/F while as anticipated enrollment squared was negatively related to S/F. This indicates that class size tends to increase with the number of students but after a point increases in students result in smaller classes as more specialized course offerings are made available.

TABLE 3

Regression Coefficients for the Determinants of The Student-Faculty Ratio

Independent Variable	Dependent Variable S/F
% BA	−0.047***
	(0.01788)
S	0.001511***
	(0.000427)
S^2	−.0000000912**
	(0.0000000455)
ΔS	4.74***
	(1.5777)
U	−5.93***
	(0.83123)
E/S	−0.0033***
	(0.000653)
% LA	0.0398***
	(0.014565)
C_3	0.000832***
	(0.000166)
Constant	12.376
R^2	53.72
Standard Error of Estimate	4.3149

*** Significant at p<.01
** Significant at p<.05
* Significant at p<.10

Note: Standard errors are in parenthesis

The change in the number of students was also positively associated with changes in the student-faculty ratio. This result suggests that administrators react to increases in enrollment by simply raising the number of students in a class and/or increasing the number of classes taught by the faculty. It also suggests, however, that if there are short-run declines in enrollment there is no corresponding reduction in the size of the faculty.

The variable %LA as expected was positively related to changes in the student-faculty ratio. A one percent increase in the share of revenues that come from local sources would increase the student-faculty ratio by 0.04, all other factors held constant.

Increases in the level of expenditures per student, *ceteris paribus*, result in a decrease in the student-faculty ratio. For each $10.00 increase in expenditures per student the student-faculty ratio is estimated to decline by 0.03.

Holding all other factors constant, increases in total compensation would lead to a positive change in the student-faculty ratio. This suggests that where the budget line and other factors are fixed, an increase in compensation will lead to a smaller number of faculty per student. This result is totally consistent with basic demand theory. In this case compensation represents the price of the good and the number of faculty per student can be viewed as the quantity measure. Increases in price (i.e., compensation) result in a decrease in quantity demanded (i.e., faculty per student).

Finally, the existence of a collective bargaining agreement was associated with reductions in teaching loads. When all other factors are held constant the existence of a collective bargaining agreement was associated with a 3.93 reduction in the student-faculty ratio. Thus it appears that collective bargaining has had some impact, not only the compensation of faculty, but also their working conditions as reflected in the student-faculty ratio. The results suggest that additional compensation gains might have been possible if unions were willing to trade off some of the improvements made in faculty teaching loads.

Concluding Remarks

This paper has attempted to detail the characteristics of community colleges and the impact of bargaining in the community colleges. A cross-sectional regression analysis of the type used in this study is by no means definitive. It does not separate out cause from effect, nor does it show changes over time, however, it is suggestive of possible initial effects of unionization in this sphere.

Unionization appears to have raised total compensation primarily through its impact on increasing the value of employer contributions on fringe benefits. The fringe benefit area has provided a very attractive focal point for unions because of the generally low level of such benefits in the community colleges and the tax advantages inherent in purchasing some of these items through group employer plans rather than individually with after tax income.

While unionization did not have a significant effect on salaries, it did appear to reduce significantly the relative teaching load. These results suggest the possibility that in the initial years of bargaining the faculty have been willing to trade off potential salary gains for increased welfare and better working conditions. In the future one might expect the type of relationships shown here to change as bargaining matures and certain concerns become less paramount. No attempt has been made here

to distinguish between colleges who have negotiated one contract versus those which have negotiated two or more agreements. It may well be that there is a difference between the type and level of demands and offers in the first contract as opposed to subsequent contract bargaining.

As the academic labor market has shifted from a sellers to a buyers market the community colleges have begun to attract a larger percentage of their faculty directly from graduate schools and from teaching positions at four year colleges and universities. This influx of faculty may have resulted in a change of focus of the community college from the secondary school systems to the colleges and universities. The decline in relative teaching load seems to be an indication of this change in focus.

Bargaining has not been limited to the matters addressed in this paper. There are numerous other matters such as tenure policies, faculty participation in academic decision-making that have been the subject of bargaining. To the extent that these so-called nonpecuniary matters are of concern to faculty, this study has only begun to touch upon the impact of bargaining on faculty. There is clearly a need for a detailed assessment of the impact that bargaining has had on these other aspects of working life in the community colleges.

Footnotes

[1]Robert J. Thornton, "The Effects of Collective Negotiations on Teachers' Salaries," Quarterly Review of Economics and Business, 11, 4 (Winter 1971):37.

[2] H. Wellington and R. Winter, *The Unions and the Cities* (Washington: The Brookings Institution, 1971), pp. 15-21.

[3] As used in this study fringe benefits refer to employer contributions to retirement plans that are vested and not vested, hospitalization, surgical and medical plans guaranteed disability income protection, tuition plans, housing plans, social security taxes, unemployment compensation taxes, group life insurance and other benefits in kind with cash options.

[4] Since linear transformations of least squares estimators are also least square estimators it follows that the estimators of the salary and fringe benefit equations will satisfy the restrictions imposed by the compensation equation (e.g., the estimates of the union parameter in the fringe benefit and salary equations will add to the estimate of the union effect on compensation). Thus, we may obtain separate estimates of the union/nonunion effects on salary, fringe benefits and total compensation. See Orley Ashenfelt "The Effect of Unionization on Wages in the Public Sector: The Case of Firemen," *Princeton University, Indistrial Relations Section*, Working Paper #21 (July 1970), pp. 15-16

[5] See David B. Lipsky and John E. Drotning, "The Influence of Collective Bargaining on Teacher's Salaries in New York State," *Industrial and Labor Relations Review*, 27, 1, (October 1973): 18-35. The Lipsky and Drotning argument and findings are consistent with the more general results of other authors who have found that large establishments pay higher wages on average than small establishments in the same industry. See for example, Richard A. Lester, "Pay Differentials by Size of Establishment *Industrial Relations*, 7 (October 1967): 57-67

[6] Albert Rees, "Compensating Wage Differentials," *Princeton University Industrial Relations Section*, Working Paper #41 (January 1973), pp. 17-18

[7] If two or more colleges are located in the same county they are assumed to have the same external environment as reflected in the value of alternatives, but they are not precluded from having a different internal environment.

[8] The dependence of various disciplines on the academic labor market is indicated by the percentage of Ph.D.'s who enter college teaching. Cartter has noted that for most humanities disciplines, between 85 percent and 95 percent college teaching; the percentage is about 70 percent in social sciences, 50 percent in life sciences and 35 percent in physical sciences. See Allan Cartter, "The Academic Labor Market," in Margaret S. Gorden, ed. *Higher Education and the Labor Market*, (New York, McGraw Hill, 1973), p. 301.

[9] See, Robert N. Baird and John H. Landon, "the Effects of Collective Bargaining on Public School Teachers' Salaries—Comment," *Industrial and Labor Relations Review*, 25 (April 1972): 410-417.

[10] See Robert F. Carlson and James W. Robinson, "Toward a Public Employment Wage Theory," *Industrial and Labor Relations Review*, 22, 2 (January 1969): 243-248. Carlson and Robinson discuss the basic choice between quantity and quality of inputs that faces public administrators. Absent the earlier results on the relationship between compensation and %LA, the *a priori* relationship between the S/F and %LA could not have been specified.

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